OBSERVATIONS

ON

THE ATTACK

OF

MUD FORTS.

IN WHICH ARE NOTICED BY WAY OF ILLUSTRATION,

OCCURRENCES THAT TOOK PLACE AT VARIOUS

SIEGES, PARTICULARLY THOSE OF

BHURTPOOR, AND DEEG,

IN

1804-5.

BY AN OFFICER,

OF THE BENGAL ARMY.

* "Multa sunt, quæ quamvis cognita non magnam mereantur laudem,
"eadem tamdem ignorata non leve possent dedecus imprimere."

Calcutta:

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1813.

PREFACE.

If the manner in which the following little work is executed be not deemed a sufficient passport for it, the importance of the subject assuredly will. The author trusts, therefore, that neither his brother Officers, nor the Public, expect any apology from him for offering it to them. It was written several years ago; and, but for particular reasons, would then have been laid before them. These reasons, now, no longer exist; they were not attributable to him; it was written to be published.

When an anonymous work appears, should it be fortunate enough to attract notice, curiosity naturally desires to know

by whom it was written. The author of this, though he has withheld his name from it, neither wishes to conceal nor to proclaim himself; but he thinks it better that it should stand upon its own ground altogether, that it may not suffer depreciation, if it meet not favor, from the influence of a name.

That the Public, however, may neither give, nor withhold from the Author, more credit for experience, on the subject he has ventured to treat of than he is entitled to, he deems it his duty to state that he has had the honor of serving in the Bengal Army for 13 years, during which period it has been his lot to partake with them his full share of active service. He has been present at *six sieges* of Mud Forts, he has seen them, *seven times stormed*, in several of which he has been closely engaged, and has, twice, had the honor of occupying an advanced post, in two of the most sanguinary contests which the service in question has ever afforded this army an opportunity of witnessing. He has also served in defence, as well as attack; and had the honor of being

one of a handful of men who besieged by a numerous native army with upwards of 100 pieces of artillery, repulsed their repeated attacks under circumstances as peculiarly difficult and disadvantageous as they were discouraging. The situation in which he was accidentally placed at the most memorable and disastrous siege ever witnessed in this country, afforded him an opportunity not only of minutely observing its progress in every stage, but, what is of far greater importance, *of experiencing, himself*, the obstacles which prevented our success. Whether he has profited by such experience, or, at least, whether, by the present work, he has enabled those to do so, who have not had the same advantages, it is for others to determine.

During the course of the operations above alluded to, the Author was in the habit of taking notes of occurrences such as appeared to him remarkable, merely for his own amusement or instruction. Of seven storms he had seen *five unsuccessful*, in which upwards of 120 British Officers

and 3000 men were killed or wounded, he had himself suffered in the same service, but survived, not however, to partake of the glory, but to lament, with others, the humbled reputation of the Army. Nor are these the only instances he could relate wherein we have been unsuccessful, others of more recent occurrence are known to all; and if our mode of warfare, on such service, be not improved, with as fine troops as ever took the field, we shall have nothing to expect but defeat, disaster and disgrace. To experience these must wound the pride of every British Soldier, but to be defeated by those upon whom he has been accustomed to look with contempt, is truly mortifying.

Such were the feelings which induced the Author to view this subject as one of great importance, and such were the feelings which induced him to draw from his private memoranda, the substance of this work, to be laid before the Public. He is aware of his inability to do it justice, but let every one do his best and much *may* be accomplished. He has no private end to serve,

no motive that could conduce him even to wish for its publication, but an ardent desire that it may be of use to the uninformed; or, at least, that it may stimulate the experienced to labor in the same field, that others may profit thereby, and that those who are to come may benefit by the experience of those who have gone before them.

The intelligent Reader will find in this work, small as it is, perhaps a good deal that might have been omitted. He must remember, however, that there are others less experienced than himself, and some who have no experience at all; and, therefore, although it may sometimes appear tedious to him, it may possibly be useful to them. If so, it will answer the intention of its Author. But he thinks its utility will be more extensive; and he has the satisfaction of knowing that it has received the approbation of men, whose judgment must ensure to their opinions no less deference than their high situations entitle them to respect.

CALCUTTA,
Feb. 6, 1813.

OBSERVATIONS

ON

THE ATTACK

OF

MUD FORTS.

THE siege of a MUD FORT (as a Fort constructed of earth, in Hindoostan, is commonly called) is a service of more frequent occurrence than any other in this country; and therefore no one who follows the profession of arms in India, ought to be unacquainted with it. It is, however, of all services, that which is the least desirable; for to those who know little of Mud Forts, their name carries with it an idea of insignificance: they are not considered by such, as strong and permanent Fortresses, but as weak and temporary fortifications; and therefore their conquest is but little valued, and little merit is allowed to

those who effect it; whereas, on such service, dispute and blame are ever attached to want of success. It has been usual to think lightly of the strength of Mud Forts, till we have been taught by experience, to think otherwise; and the loss of many a brave soldier has convinced us of our error.

The Bengal army, justly appreciating its own pre-eminence, has been accustomed to look with contempt upon troops so far their inferiors as those employed by native powers; and various instances of extraordinary success have induced them equally to despise their fortifications. This has, no doubt, been the cause of much serious misfortune; and to this may be ascribed perhaps, the introduction of a mode of warfare, against those Forts, often unsuccessful, and certainly not equal to the high and well-earned reputation of our army.

But before submitting a plan of attack, and a method of carrying on the operations of a siege against Mud Forts, different from those which have been adopted, it appears necessary shortly to state what the usual plans have been, and to notice some of their defects.

In besieging Mud Forts, the mode of attack which we have seen practised, has usually been as follows.

The besiegers have sat down before them; after which working parties have been sent out to cut down and collect brushwood, and other materials for constructing a battery; posts have been occupied, towards the enemy's works, to cover the operations of the siege; trenches have been opened, and when materials have been collected, a breaching battery has been erected, at the distance of four or six hundred yards from the Fort, and a battery for mortars, if the detachment had any, which was not always the case. Such, on many occasions was the whole extent of the works; and no nearer was it thought necessary to approach till the troops advanced to storm. The breaching battery, as soon as possible, was opened, and having fired for a short time at the enemy's defences, where guns were mounted, battering in breach was commenced. Scaling ladders have been provided, and sometimes fascines prepared, for the purpose of being thrown into the ditch, by the storming party, to make a passage across it; but the latter we have never seen used. We have seen an advanced trench of approach too, made to within a short distance of the breach, intended as cover to the storming party in advancing, but this plan was not attended with such advantage as might have been expected. Next to a

state of total disorder, is that of troops pent up in a narrow trench, as close as they can stand; and, when in that situation, to draw them out into a heavy fire, and to form them from under such cover is an undertaking more difficult than might be supposed. Besides, such a trench operating as a defile, through which the columns must pass, prevents those at the head from being supported, which of itself is an objection; for the success of an assault depends upon those who lead, and when those who lead, find themselves unsupported, they must naturally lose confidence, and that degree of resolute impetuosity which is necessary to carry a breach by storm, must consequently be impaired.

We have also known mining used, for the purpose of blowing up the glacis, that the Rouince wall (i. e. the wall which defends the Fausse-Braye) might be discovered and breached, and part of the ditch filled up with the earth thrown into it by the mine. Before this was accomplished, however, in one instance the besiegers were twice effectually countermined: the third time they succeeded, but as a breach made by artillery, firing from a distance, over the excavation of a mine, could only be partial, the defences of the rest of the wall remained entire; from which the storming party was annoyed by

■ heavy fire, and meeting with ■ deep ditch, and ■ determined resistance, after ■ severe contest they were obliged to retire, with great loss; whereas, had the enemy's defences been properly demolished, and troops stationed in advanced works to cover the storming party, by keeping in check the enemy's fire, notwithstanding every difficulty in crossing the ditch, and every other opposition, there is no doubt that, on that occasion, our troops would have succeeded in taking the place; because, less annoyed by the enemy's fire, they could have turned the imperfect materials they were furnished with, for crossing the ditch, to the best advantage, which under a galling fire it was not to be expected they could do.

Where there has been no ditch, there are few instances on record of our troops having been repulsed. Nay we have seen them surmount difficulties which were scarcely to be overcome; we have seen them force their way through gates, and over walls defended by men, whom death only could subdue; but as such great enterprizes are sometimes frustrated by accidental, and apparently, trivial circumstances of misfortune, their success must always be deemed doubtful; it is dangerous therefore to depend upon them. Nothing ought to be left

to chance, and men ought not to be called upon to perform extraordinary actions except on extraordinary occasions.

We have seen a detachment of two thousand five hundred sepoys sent to besiege a Fort, 1700 yards in circumference, defended by a garrison of upwards of 5000 men. With this detachment a train of artillery was sent, consisting of two brass and two iron 18 pounders. The brass guns run and became unserviceable; and with the two iron 18-pounders, a breach had to be effected in two different ramparts. Such was the scarcity of military stores, that ammunition could not be spared to demolish the defences, lest enough should not remain to effect a breach; and so scanty was the supply of implements in the engineer's department, that they were not procurable for the working parties. There were not even bamboos sufficient to make a second set of scaling ladders. The first set was lost in an unsuccessful assault; and before another could be made, it was necessary to send for bamboos upwards of a hundred miles. The want of artillery and stores has been severely felt on many occasions; the consequences of which it is unnecessary to relate.

Before proceeding farther, it may be proper to mention, that, in having in this manner re-

lated the methods, which we have generally seen practi cd, of carrying on operations against Mud Forts, it is by no means the author's intention, to injure the reputation of those officers who have conducted such operations, but he trusts it is hardly necessary to disavow such motives. The high opinion he has of the abilities and experience of those who have been unsuccessful on some occasions, calls upon him however to remind those who may peruse what he is now writing, of the necessity of being well informed of the means which have been furnished; and of weighing carefully the circumstances which must attend every case; and which, on every occasion, must guide the conduct of men, before they judge of the propriety or impropriety thereof. His object is not to criticise, but to endeavour to instruct, by relating, as they occurred, operations which have proved unsuccessful, and by suggesting others, which, so far as his humble abilities enable him to judge, would be better adapted to the nature of the service of which he is treating.

To an officer entrusted with the command of a detachment, it is surely unnecessary to point out the advantages which must ever attend early, and accurate information relative to the service on which he is employed. The service

now under consideration, is one of those to which accurate information must ever be of the greatest importance. To obtain such intelligence, however, is as difficult as it is important: it is a desideratum, and it is to be feared, will continue to be so. We may however venture to say, that he who has a right to look for success in this particular branch of service, must, understand, and speak well, the language of the country, and the different provincial dialects; be a man of address, well acquainted with the manners and habits of the natives, full of forbearance, kind to them and one in whom they have confidence. Liberality is no doubt essential, but by no means to be relied on. How far it might be desirable to have a permanent establishment of guides, rests with others to determine. Were such under the control of an intelligent and experienced officer, it might certainly be of use, for it is reasonable to presume that men whose livelihood depends upon their exertions in a particular service, will feel more interested in its performance than those who are merely hired to day, and may be discharged to-morrow, as no longer required, however faithful they may have been. An experienced officer, at the head of a corps of this kind, by carefully recording the intelligence he receives, through

various channels, and from different individuals, might collect a body of information, which, with sound discrimination, could not fail to be highly important. This however is a branch of service, of which we do not pretend to have a knowledge, but assuredly it is worthy of attention. With a competent force well furnished, and correct intelligence, success ought not to be doubtful.

The natives of Hindoostan know well the practical branch of the science of gunnery; but, as engineers, they are less skilful; consequently, in their fortifications, one or more weak points may always be found.

They reckon a place strong which has lofty ramparts; but the strength of their Forts consists chiefly, perhaps entirely, in the depth and width of their ditches. Any wall may be soon breached, but it requires the process of a regular siege to effect with a certainty of success, a passage to troops accross a formidable ditch.

Many Mud Forts have only one gateway or entrance; few, unless they are very large, have more than two. Draw bridges are scarcely known to the Indians: in this country never used by them.

As the ditches of their Forts, therefore, are their strongest defence, and as at their gateways,

they have no ditch (until the place is attacked; and even then, generally a small trench only, to prevent a gun from being brought up to blow open the gate), it follows that a gateway is the most vulnerable part of a Mud Fort. It is so too, because the rampart adjoining the gate, on each side, being for the most part built of brick, or stone, is more easily demolished by artillery than a wall constructed of mud.

The gateway of a Mud Fort is a desirable point to attack, because, there being no ditch, it will require the labour of the besieged, for several days to make one; and were their working parties annoyed as they might be, by shells and by frequent surprises in the night, their operations would be so impeded as not only to prevent them from making a formidable ditch, but also from repairing or constructing other defences.

Should a Fort have only one entrance or gateway, to attack it there is particularly desirable; because, thereby, the besieged are completely and closely invested, which, to the natives of this country, is extremely irksome: all communication with the country is cut off; and their escape being rendered uncertain, they will be deterred from abiding the result of an assault; whereas, when their liberty is less con-

strained, and they see that at any time, they can escape, they will hold out as long as they please, and retire when they think proper. Besides by attacking ▪ gateway, the besiegers are less liable to be insulted by sallies, and better prepared to repell them; because the whole of their force is directed to the point, (namely the gate); from whence ▪ sally must necessarily be made. Moreover, close to the entrance of every Fort we have seen in this country, some cover is always to be found; such as huts, occupied by poor out casts, who are not permitted to live within; which though burnt down, the ruins of them will often be found of the greatest use, as cover to an advanced party. There is generally a well, often one or two large trees, and sometimes ▪ Fuqeer's dwelling very near, which ought not to be over looked.

These, and several other reasons which might be enumerated, induce the author generally to recommend the gateway of ▪ Mud Fort, as an eligible point to attack. They are merely general observations, and perhaps may not be thought of great importance; but he hopes they are sufficient at least, to induce every officer who may peruse them, should it be his lot to conduct the siege of a Mud Fort, to reconnoitre well its gateway, and to be particular in obtaining the

most correct information regarding it, before he give the preference to any other point.

The *Kutra* too, is a place to which we would beg attention. It is a town or village, generally surrounded by a wall, but seldom of great strength which in Hindoostan is called *Kutra*; in other parts of India Petta, &c. The Kutra is situated generally very near the Fort, and often adjacent to a gateway. The advantage of having such a post is obvious, when near a gate; indeed when more remote, the cover which it must always afford will point it out as a place of great importance to the besiegers.

Should the Fort to be attacked be small; but, especially if it should contain a numerous garrison, instead of proceeding against it by the process of a regular siege, we would strongly recommend bombardment! not however in that partial, and desultory way, which, on account of the want of that description of ordnance, we have always seen practised; but with such a train as would enable the besiegers to keep up a constant uninterrupted fire on every part of the place, so that the besieged might no where find shelter. The grounds of this opinion must appear obvious to every one: it is enough, therefore, to say that such a place, besieged in a regular manner, might hold out as long, and that the difficulty of carry-

ing it's breach, by storm, might be as great as that of one, ten times as large and containing ten times as numerous a garrison.

On the other hand, when a place is very extensive, and when there exists no impediment to prevent a gun from being brought up, we would recommend blowing open its gates; for in this case, surprize, the necessary effect of such an attack, must operate strongly in favor of the assailants; whereas in the case of a regular siege, be the garrison ever so disproportionate to the extent of the place, when a breach is made, the whole force of the besieged will be directed to the point of attack; and it ought to be expected that at a breach, they will be always prepared to receive the enemy. Besides, if a breach be defended at all, it can scarcely be carried in less time than is required to force the gates of a place; and should there be any difficulty in crossing the ditch, to storm a breach, the mode of attack here recommended, there is no doubt, would be attended with the least loss.*

* Respect for, as well as justice to the memory of the late beloved and lamented Commander in Chief Lord Lake, induce the author to remark here that in the only instance, during his brilliant career in India in which he failed, his failure was in consequence of not following this plan. That he knew this the author has been told and that he has often been heard to lament, that he did not

When a detachment is ordered against a Mud Fort, the officer commanding ought to be provided with the most ample means of procuring intelligence. He ought to be supplied with a powerful train of artillery, abundance of stores, in the artillery and engineer departments; and, before he approach the place, ought to furnish himself with gabions and fascines sufficient to erect, at least, four batteries; one of 4 guns 18 prs. on each flank, in the 1st parallel (see pl. 1) to demolish the enemys defences (i. e. the parapet of the rampart and bastions, on each side of the point where he intends to breach), and two more in the 2d parallel each for four 12 prs. Should he neglect this, and sit down before the place without being previously provided with these

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follow his own opinion and blow open the gates at Bhurtpoor; which had he attempted, he would most certainly have succeeded in and would have taken the place, as he himself said in an hour!

The Fort of Alee Gurh, beyond all comparison stronger than Bhurtpoor, was taken by his Lordship by blowing open its gates, and, although defended with so great obstinacy that part of the garrison, even after they were completely in the power of our troops, disdained to accept quarter, yet the loss on our part was not half so great as that suffered at any one of the four assaults at Bhurtpoor. The gates of the Fort of Rumpoorah were blown open by a small detachment under Colonel Don, in the same campaign, with little or no loss at all.

materials, a delay of many days must take place till they can be collected; during which time the besieged will no doubt, employ themselves in repairing their works At all events he ought carefully to avoid taking up his ground, near the point which he means to attack, until no delay can occur to the immediate commencement of the siege.

Such materials being provided, he will reconnoitre, and compare the the intelligence he has received with what he himself has seen; and will determine accordingly the situation of his camp, and his plan of attack: after which he will take possession of posts to the right and left to cover his approaches. For that purpose villages are generally to be found, within four or six hundred yards of the Fort. These he ought to secure well; and mount two or more 12 pounders in each to prevent his works from being insulted on the flanks. The same night, the two flank batteries, above mentioned, ought to be erected, not more than 400 yards from the Fort, and about the same distance from each other, for reasons which will appear hereafter.

Such batteries may be erected, with common exertion, in one night. We have seen a party of 80 Europeans and 200 Sepoys march from camp at sunset, break ground at 400.

yards, entrench themselves, erect ■ battery for four 18 pounders and open their guns, before sunrise next morning, without losing ■ man. This happened at the siege of Deeg on the night of the 20th December, 1804. "It was half "past nine when the engineer began to mark "out the battery, and about an hour afterwards "the parallel; we soon entrenched ourselves; "and the battery was completed by daybreak, "when the guns opened with great effect, and "very soon demolished the small gateway. By "sunset we had fired upwards of 600 rounds, "which had more effect than the grand battery, "which opened on the morning of the 17th. We "had wrought nearly three hours before we "were discovered; and when (as we supposed) "they did discover us, they fired only ■ few "shot in the night. At day break, however, they ■ opened a number of guns upon us, but, then, "we were secure, and suffered no injury, not "a man was touched. December 2nd, this "battery continued to play all this day, and by "evening the breach was practicable." Extract from journal of the siege of Deeg, December, 1804.

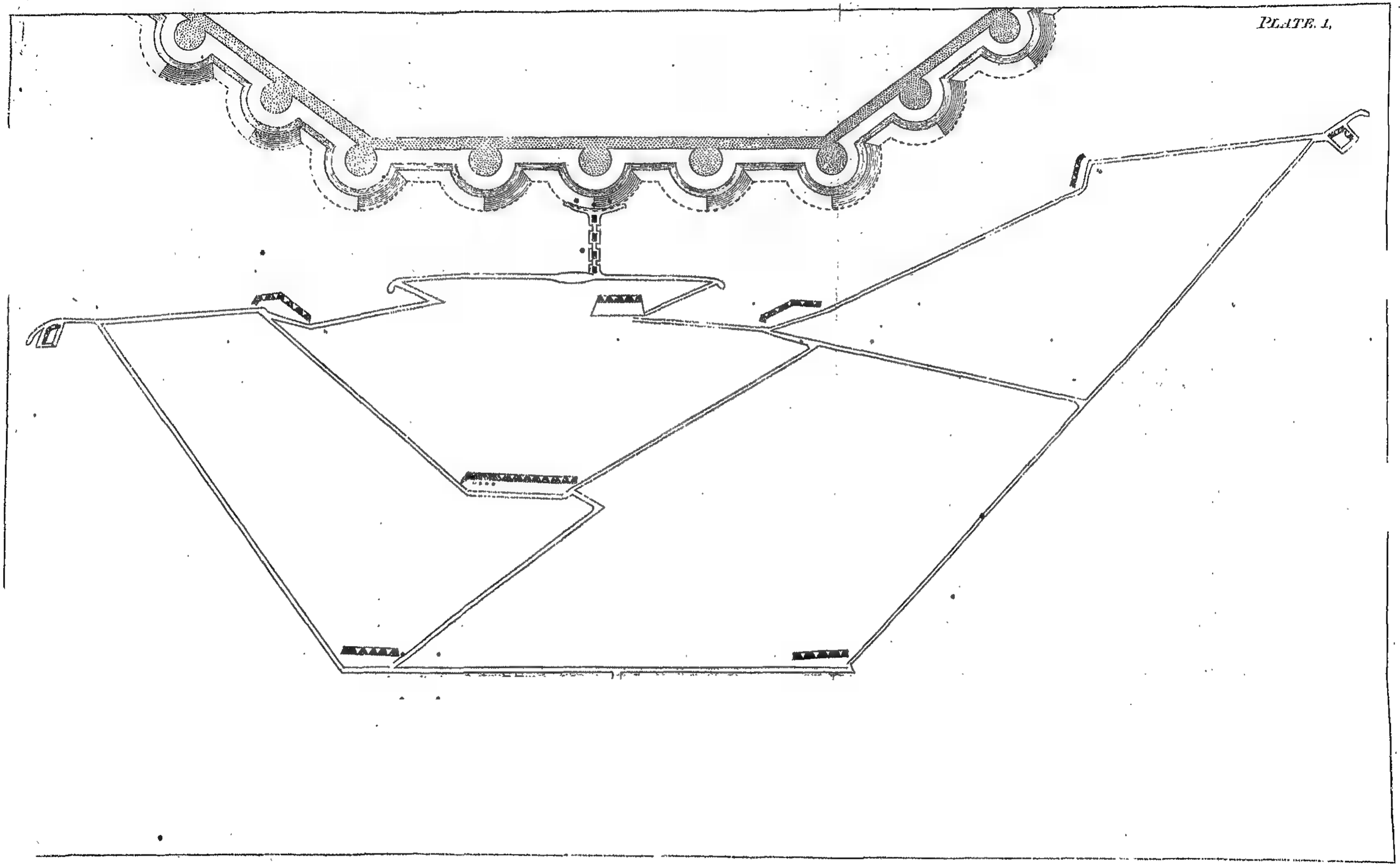
An engineer, acquainted with such service, may derive great assistance from the officers commanding the troops sent with him to cover the working party. He will mark out the length

of his battery, after which he will point out the direction of the trenches, by picketing a line, of a few yards in length, from each flank of the battery; and the officer commanding the troops will see that such line be properly extended, and superintend the sinking of the trenches; which his men, if well supplied with tools, and encouraged by their officers will execute with cheerfulness in a very short time. For the safety of his men, every officer ought to exert himself on such an occasion.

Besides tools for the use of the workers, the troops sent on service of this nature, ought to be supplied, as well as the workers, with the following implements. Measuring rods of 6 and 12 feet, painted black and white, alternately, by feet; logline, small pins for picketing it, and light mallets for driving the pins. They ought also to have hatchets, picks, spades, *Phaoras* or hoes and baskets. Europeans work best with picks and spades, natives with *Phaoras* and baskets. Europeans when willing, can do more work than natives, but the latter, by the example of their officers, are easily stimulated to very great exertion, and we have often seen them with their officers, (both European and Native) work a whole night without intermission; and with the greatest alacrity.

Every fourth man, of the covering party ought to be provided with implements, which allowing for those standing to their arms, and those who must necessarily be detached, to guard against surprize, will afford a relief to those who work a certain and equal portion of the trench ought to be allotted to each company; which by creating emulation will tend much to expedite the work. Each officer commanding a company will of course, superintend the execution of that part allotted to his men, and regulate the reliefs of his workers. By these means the engineer will be freed from the necessity of giving much attention to the trenches, and will direct with care the construction of his battery. If possible the two batteries in the 1st parallel ought to be completed in *one* night; for it is certain that the enemy, having in the day, ascertained the level and direction will bring every gun he can to bear on them, and annoy, the working party the next night. *The first night's work is of infinite importance.*

As the guns of batteries intended to demolish defences such as those mentioned, are directed to objects above their own level, their platforms may often be sunk two feet, which will lessen considerably the labour in constructing the battery.



The trench of communication between the two first mentioned batteries forms part of the 1st parallel, (see pl. 1); which must afterwards be extended beyond the outward flanks of the batteries as far as necessity may require, and may be defended, at each end, by a small redoubt of two or three 6 or 12 pounders.

Thus supposing the 1st parallel to have been completed, (which if the engineer has properly reconnoitred and taken his observations accurately; we think in general may be the first ground broke before a Mud Fort; leaving the trench of approach to it, for the safety of the troops at a relief, to be cut afterwards): we say, supposing the 1st parallel to have been completed, and the batteries in it erected, their guns will be turned against the enemy's defences, and they must continue playing upon them till they be so thoroughly demolished, that *no part of the parapet remain*. All the enemy's guns which can be brought to bear upon that part where the breach is intended to be made, ought to be dismounted. As this is a matter of infinite importance, too much attention to it cannot be paid. It must not be concluded that any particular gun is dismounted, or rendered useless, because the enemy ceases to fire it. We have seen instances of this kind, where it was thought

a gun had been completely disabled, till when the assault took place, it re-appeared, and proved the most destructive of any. Such deception is often practised, and ought to be guarded against. We have seen when the parapet of a bastion was completely destroyed, a ramp cut behind a gun to allow it to recoil so far as to be under cover, where it was loaded and again dragged up to be fired, and continued thus playing upon the storming party during the assault.

Whilst the batteries in the 1st parallel are employed in demolishing the enemy's defences, the engineer ought not to lose a moment in carrying on his approaches to the ditch. Supposing therefore, that the Fort attacked presents a parallel face, even of 400 yards; which is rarely the case: indeed no Fort ought to be attacked on ▪ face of so great parallel extent, unless there be advantages which do more than counterbalance the disadvantage, which must necessarily attend such a plan of attack. Here it is surely unnecessary to remind the reader of the first principle of attack of fortified places, by recommending the attack of ▪ salient angle. But we have chosen an extreme case; and suppose that the Fort to be attacked presents ▪ face of 400 yards: from his battery on the right in the 1st parallel, distance from the Fort 400 yards,

let a line be run of 280 yards at an angle, of 35 degrees to the left; which will bring him about 160 yards nearer the Fort. Where this line terminates he will fix on a spot for his breaching battery, but delay constructing it; and from the battery on the left in the 1st parallel, he will carry on an approach also at an angle of 35 degrees, to the right, till it intersect the line abovementioned; from whence he will extend the approach in the direction of that line, till it reach the spot fixed on for the breaching battery. When this is done, from the right flank of the spot fixed on for the breaching battery he will run a trench, at an angle of 40 degrees, 250 yards to the right, where he will erect a battery for four 12 pounders; and also from the left of the breaching battery, he will run a trench, at the same angle; and of the same extent, where he will erect a battery of the same strength. This will form the 2d parallel.

After these two batteries, in the 2d parallel have been completed, (the enemy's defences having been demolished by the 18 pounders in the two first erected batteries in the 1st parallel), the 12 pounders of the two batteries in the 2d parallel will be sufficient to prevent the enemy from repairing his defences, and leave the 18 pounders, in the batteries of the 1st parallel, to

be withdrawn for the use of the breaching battery, which may now be erected; and the same night an advanced approach may be carried on 100 yards towards the ditch. This approach ought to commence from the left flank of the right battery, in the 2d parallel, and run to the left 150 yards; approaching the Fort as much as possible, so as not to be enfiladed; neither must it extend so far to the left as to cross the line of direction of the fire from the breaching battery.

When this approach is advanced to within 80 yards of the ditch, a third parallel ought to be made, sufficient to contain 200 men, and to leave a space to be used as hereafter mentioned. From this parallel the advanced approach will be continued straight to the breach, by sap, with traverses in it, to prevent its being enfiladed.

At the siege of Bhurtpoor, an advanced approach of this kind was carried on to within 30 yards of the ditch, and beyond a salient bastion upwards of 40 feet high. It was then moon light, yet this work was executed, without cover, by the pioneers and common Beldars, with little loss, a few of them only were wounded by matchlock shot.

From this sap the entrance into the ditch

is to be effected. Should it be intended to blow up the counterscarp, from it the miners will be lodged: and here it may be proper to observe that miners cannot work under ground farther than 90 or 95 feet. This the author has heard from ■ native, ■ very expert miner, and ■ man of considerable information and experience relative to the mode of attack and defence of Forts, practised by the natives of India in their own warfare, he has, however himself seen a mine carried on and loaded 115 feet.

In carrying on advanced approaches, the greatest care ought to be taken to have them well defended. The nearer the enemy's works the greater the danger of being molested. Proper banquettes ought to be made for the men who guard them to stand on, that in case of ■ sally, they may be able to fire over the parapet with ease; otherwise they will be exposed to insult without having it in their power to defend themselves, as was the case at Bhurtpoor, on the morning of the 19th and 20th of February. On the 19th the enemy made a sally, and, without opposition, destroyed a battery for two guns which was nearly completed. This battery was within 60 yards of the ditch. And on the morning of the 20th another attack was made, on our advanced trenches, which, with much dif-

fculty, was repelled by a party of H. M. 75s and of Sepoys, under Lt. STEWART, who with 10 Europeans and some Sepoys, was killed in the trenches. This was the consequence of carrying on works so near to those of the enemy without having places of arms, with proper banquettes, for troops to defend them. Such trenches must necessarily be deep; and unless they are so constructed as to enable men to stand high enough to level over them, the disadvantage of those who defend them is evident, for if the enemy be bold enough to approach a trench that has no banquette (which he may do without opposition), the bayonet is the only weapon those in it can use, and they are cramped in the use of it even, but, with proper banquettes those who defend the trenches have a decided advantage and can by musquetry, repell the enemy before he approach them.

It is the particular duty of every officer to see that his men are as secure as circumstances will admit of; and if the engineer should not have been sufficiently attentive to the construction of such banquettes, he ought to make them for himself, and not to rest till he has done so. No great labor is required, and it may be performed in the day, when he can have as many tools as he pleases; for, then they are seldom

required for working parties. To such a duty as this the attention of every officer is urgently called, but lest it should be neglected, *those who* may be entrusted with the command of troops employed at a siege, would do well to see themselves, or to send their staff to see that it be properly executed, for although it is more immediately the duty of the engineer, the scarcity of engineer officers in this service renders their duty at a siege so severe, that even those who are generally most correct, may be liable to omission.

We have already spoken of the 3d parallel. This parallel is of so great importance, that most particular attention ought to be paid to its construction. It ought to be of a length sufficient to contain at least 200 men *in single* file, and to afford a passage across it, near its centre, for the advance of the storming party. The banquette, and embankment, or parapet of this parallel ought to be most carefully constructed; and for the better protection of the men, when firing, small embrasures or loup holes, might be made by placing two sand bags near each other, with a third laid across, leaving a space between for the muzzle of their pieces, widest towards the enemy, which besides saving the lives of many would make the men more cool

than if they were less exposed, and thereby render their fire much more effectual: a thing of great importance during the assault, and upon which much may probably depend.

The advantages to be expected from a party stationed in this parallel are these, protection to the miners and sappers; being so near the enemy's works, from it they can be examined, with little danger, the exact state of the ditch ascertained, and small parties advanced, in the night to fire into it, to harrass the enemy's workers, in case he should attempt to enlarge the ditch, which he will most certainly do, as soon as he ascertains where the breach is to be made, unless thus prevented, as was most successfully practised at Bhurtpoor. There was no *Roũaee*, and the space between the ditch and rampart was not great. As soon as the enemy from the direction of the fire of the breaching battery perceived the spot where the breach was to be made, he began to enlarge the ditch opposite to it, and before the breach was practicable he had formed a pool in front of it, extending close to the foot of the rampart, and embracing a space on each flank of the breach; so that it could not be approached except by crossing that part of the ditch which was enlarged.*

* There was no regular flow of water in the ditch at Bhurtpoor, but by means of *Bunds* (i. e. banks or

A party stationed in the third parallel can also impede the enemy in countermining; or if not, they may perhaps be able to frustrate his intentions by firing his countermines, or causing himself to do so, previously to the assault. This was attempted at Bhurtpoor, in the way after mentioned, on the night of the 19th February; but failed owing to misconduct in its execution.

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dams), over which the water was thrown from one dam into another, as the natives of Hindoostan irrigate their land, water was conveyed wherever it was required, and the ditch when widened was filled in this manner in front of the breach. The first breach was made close to the right flank of a bastion which projected about 60 feet. On the 9th of January, the first assault, there was a pool of this kind, extending from the bastion on the left of the breach about 50 yards to the right immediately in front of the breach. The bund which formed this pool was level with the water, and at a considerable distance, so that in the dark it was not perceived. There had been another bund however near the middle of the pool, the remains of which enabled part of the storming column to cross the ditch. This bund was about three feet broad at the narrowest part, where a space of about fifteen feet in width was broken down, about 4 feet below the level of the water leaving consequently a space, 15 feet wide and containing about four feet of water, in depth to be crossed by the storming party, but on either side of this broken bund the water in the pool was far beyond the depth of a man. As we advanced to the breach, this bund was to our left, and the breach was cut off by the pool.

Every officer of the army was deeply interested in the success of this unfortunate siege, but the author of these pages was accidentally placed in a situation which gave him an opportunity of attending to circumstances which otherwise could not have fallen within his reach, he was particularly desirous of ascertaining the state of the ditch * and whether the enemy had

in the manner above described, so that after crossing the ditch. the breach could not be approached, except by a small berm at the bottom of the rampart, about 2 feet in breadth, which communicated with the right flank of the breach. This small berm formed the only passage to the breach, and was defended by a gun in the flank of the adjoining bastion, which completely raked the berm, but fortunately the gun was seldom sufficiently depressed to answer the purpose for which it was so well intended.

* A native non-commissioned officer, was induced by the promise of promotion and a pecuniary reward to attempt to execute the following plan, in order to ascertain the dimensions of the ditch. He was furnished with a bow and heavy arrow, to which a small silken cord was fastened. This arrow he was to shoot from the glacis into the opposite scarp of the ditch, and by means of the cord which was fastened to the arrow, and marked, ascertain the width of the ditch. He was also furnished in case this should fail with a piece of iron of an irregular form with a cord fastened to it, which he was directed to throw across the ditch and keep pulling it towards him till it began to roll down, marking the

countermined the glacis, and from the information he received, he was certain that they had sunk several countermines opposite the breach, with the intention of springing them under the storming party. To endeavour to fire those mines therefore, previously to the assault, was worthy almost of any sacrifice, but by no means easily accomplished. He knew that the natives run the galleries of such mines from the counterscarp of the ditch: if a dry ditch, the door of the gallery is within two or three feet of its bottom: if wet about the same distance above the surface of the water. At the door of the gallery an excavation is made in the counterscarp to form a kind of plat-

line at the moment it began to roll; and also the soundings and thus to ascertain both the width and depth of the ditch at the same time. The man made several attempts, and with much perseverance endeavoured to accomplish his purpose, but at that time the enemy had a chain of sentries posted at night between our works and the ditch, which rendered it impossible for any individual to pass. It was therefore suggested that a small party should be sent in the night to force its way through the enemy's sentries to examine the ditch which might have been done certainly and with little loss; but it was superseded by the following plan which a non-commissioned officer and two troopers of native cavalry undertook to execute. They were mounted and sent down to a post on the right flank of our trenches where they were ordered to throw off their jackets, and gallop straight to the

form, on which when the mine is loaded, and the door shut, a quantity of loose powder is strewed; and the way they fire it, is by throwing from the opposite side, or scarp of the ditch, a quantity of live coal on this powder, which communicates with the saussage and fires the mine.

The advantage which must result to the besiegers, from firing the enemy's countermines before they assault a place, could not escape less skilful warriors than the natives of Hindoostan. They attempt it among themselves, on all occasions. *Bhungees*, men usually employed to perform the most menial offices, are also engaged by the natives to execute the most desperate breach, pretending to desert to the enemy, and to be in quest of a gate to get into the Fort at, and in order to complete the deception, the troops stationed at the post from which they set out, were ordered to fire upon them with blank cartridges. The plan so far succeeded admirably. The enemy believed them to be deserters and beckoned to them from the walls to keep to the right where the gate was. This the troopers pretended not to understand, but rode up to the ditch, and when they had seen it, turned their horses and galloped back to their post unhurt. They gave a correct account of that part of the ditch which they did see, but unfortunately they did not go far enough to the left to see it at the breach where only it had been widened, and their information tended only to mislead, for except at the breach, there was in fact no ditch worth mentioning.

perate services: among others that here mentioned. Two or three of these are generally employed. They strip themselves naked, take each a pot filled with live coal, which he conceals under a loose cloth thrown over him; and having in the day, reconnoitred, they go at night, up to the ditch, and having thrown off the cloth, strew the fire along the counterscarp; so as to roll down, and fall upon the loose powder on the platform above described, and fire the mine. If they succeed, and escape the explosion, and the enemy, they receive a handsome reward, if they do not escape, it is invariably given to their families.

In this way the natives sometimes succeed in springing the enemy's countermines, but we shall not presume to recommend it, farther than by saying that a trial can do no harm. It was suggested at Bhurtpoor; and on the 19th February, before mentioned, three Bhungees were procured, who, undertook the execution of it for a reward of 1000 rupees each, if they should succeed. They asked a few rupees; which in order to encourage them, was readily granted; and being provided with every thing they required, two confidential men were sent along with them, to see that they were guilty of no deception. When they had taken leave, however,

probably with the intention of stimulating their courage they bought a quantity of spirits, with the money they received, which so intoxicated them, that by the time they reached the trenches, they were totally incapable of doing any thing and the plan failed.

On the same night, a party of Europeans, with a commissioned officer, and a sergeant of artillery, with a slow match, was sent for the same purpose. If they could not succeed with the match in springing the countermines, the party was ordered to fire into the breach, that the enemy, supposing it a real assault, might spring their mines themselves; but this also failed. The next day the assault was made, *and the enemy sprung three countermines in the glacis opposite the breach.*

The troops stationed in the *third* parallel, can also by their musquetry, prevent the enemy from stockading the breach in the night; and this is of great importance; for round shot and shells are not sufficient to do it. Our breaches at Bhurtpoor were found regularly stockaded, every morning, though a shot and a shell were fired into them every five minutes during the night: *grape* or *musquetry* can only be relied on.

The last, and greatest use of the *third* parallel, is that the troops stationed in it, cover

the storming party; for when the column advances, every battery, at a distance, must cease firing at or near the breach, because the column intervenes: the fire, therefore, of 200 steady men in this parallel cannot be too highly valued. If they do their duty, the defences being properly destroyed, they will prevent the enemy from appearing on the rampart, or near the breach, and thereby enable the head of the storming column to enter it with little loss. This, of itself, would tend greatly to ensure the success of an assault: without it, the head of the column will most certainly suffer severely from the enemy's musquetry on the ramparts; and, added to this, if they meet with a ditch difficult to cross, the result most probably will be a repulse.

The third parallel having thus been completed, the breaching battery may be opened; for almost any wall may be breached in three days; and with great exertion, it will take at least that time to work into the ditch. Were it possible to calculate so exactly as that a practicable breach should be made, and a passage into the ditch effected at the same time, it would be of great importance towards the success of the siege; for an active and determined enemy will multiply obstacles to the besiegers in proportion

to the time given him, after he has perceived the exact point of attack. If a breach be made eight or ten days (which we have known) before the besiegers be prepared to storm, fatal indeed may be the consequences, the breach stockaded, mined or cut off altogether, as was done by us when Dihlee was besieged by Hoolkur in 1804. The rampart of the city which was high, but of no strength, was demolished in a few hours, and a breach made, sufficient to admit with ease, a whole company abreast. In one night, however, this breach was completely cut off in the following manner. Behind that part of the rampart, which was breached, and about 20 feet from it, there happened, fortunately, to be a wall of an old building, somewhat lower than the rampart. On each side of the breach the space between this wall and the rampart, at both ends of the wall, was built up by us, and barricaded with whatever could be procured to answer the purpose, so that not only a ditch was formed behind the breach, but the passage by the foot of the rampart was entirely cut off. The communication by the top, or terreplein of the rampart, was also cut off by rows of Chevaux-de-frise, and breast works, well defended by troops; and behind the wall above-mentioned a scaffolding was erected for

a party to stand on, to fire over the wall direct into the breach, so that this breach, though, from the outside, it appeared accessible to any thing, was really, by far the strongest part of the town.

Should the besieged be allowed time, they may also construct batteries inside, to bear upon the breach, by which a storming party would be severely galled. All these modes of defence may be adopted, besides many others, which the mind of man, when it has time for reflection, will not fail to suggest to his necessities, whereas, in the bustle of surprise, it often forgets the most common expedients.

But although expedition in carrying on the operations of a siege must always be attended with the best effects, and against an irresolute garrison, may often render successful operations in themselves imperfect, yet, against a determined enemy, no advantage which may be expected from expedition, ought ever to be allowed to supersede the necessity of the most watchful precaution: nothing ought ever to be left to chance. In such a case a siege must be arduous; and rashness is ever to be avoided: let every opposition be expected, and every means will be provided to overcome it.

Having brought our operations thus far, the most formidable obstacle is yet to encounter;

namely, effecting a passage across the ditch.

In Hindoostan, Mud Forts have generally what the natives call a *Roũnee*, which is a Fausse Braye, or space between the rampart and ditch, defended by a wall or breast work, extending along the scarp of the ditch, and is about 2 feet higher than the crown of the glacis, to enable troops stationed behind it to fire over the glacis. Sometimes cannon are mounted on this wall, as was the case at Alcegurh in September, 1803. When this wall is well defended the passage of the ditch is rendered extremely difficult. It might be of use to erect a ricochet battery of three or more 12-pounders to play upon those stationed to defend the *Roũnee;* which battery must be erected beyond the most salient angle of the enemy's works, in order to enfilade the *Roũnee*, otherwise it will be of little use; were it well situated, and its fire well directed, such a battery would be of great service during an assault; but as we have seen the natives of this country stand a cannonade with much coolness; and as it often happens that they are determined to make a desperate resistance; as they do when fighting in defence of an ancient family castle; or to maintain the dignity of a name renowned for valour, no plan ought ever to be depended on, by the besiegers, which did

not present a certainty of success. A ricochet battery in such a case cannot be depended on, to check sufficiently the enemy's fire from the *Roũnce*, the assault therefore must not be made till the *Roũnce* wall be as completely destroyed as we have before recommended, that the parapet of the rampart and bastions should be, so that no cover for musquetry may remain upon it: and this can only be done by a battery on the crown of the glacis (which is extremely difficult to construct, and liable to be blown up by the enemy's countermines) or by an *elevated battery*, the guns of which would bear upon the parapet of the *Roũnce* wall, over the glacis, with such a plunge as to destroy the whole of its defences. The author is not aware that such a battery was ever used, but he thinks it highly practicable, even where the ground affords no advantage. Labor can do much, and it is not to be doubted could soon complete such work. He therefore begs leave to submit the plan, with a few observations on the mode of constructing such a redoubt, to the judgment of those who may have occasion to consider of it; expressing at the same time his firm conviction of its practicability and great utility.

Supposing such a battery to be placed at the distance of 80 yards from the counter-

scarp; that the ditch is 10 yards wide; that the glacis is nine feet high (which is more than they generally are) and the *Roũnee* wall is two feet higher than the crown of the glacis, or 11 feet higher than the common level of the ground; the elevation of the platform of the battery so as to enable its guns to bear upon the *Roũnee* wall, three feet below the crown of its parapet, ought to be about 14 feet.

A battery, or redoubt of this kind, for three 18-pounders would not require to be at top more than 16 yards in length, and in breadth about eight yards; and allowing for a sufficient slope, would contain about 1000 Cubic yards of earth. Reckoning, therefore at the same rate of labor as is done in Europe, it would require 100 men 28 hours to dig the earth: allow them 12 hours more in building, it will take 40 hours in erecting; but as the soil in this country, is in general soft and free from stones, the time allowed for digging might be computed at less than 28 hours; and as such work might be carried on in the day, the whole might be completed, and the battery opened, at any rate, in less than two days and two nights. But even were a longer time required its utility would be a sufficient compensation for any labor necessary in constructing it.

The situation of such ■ battery ought to be near the centre of the third parallel, either *in front or in rear*: *if in the rear, it would be* more easily constructed than in front, because the parallel would afford cover to the workers, at least for sometime; until the forward state of the battery rendered that no longer necessary. But whether it be situated in front or in rear of the parallel, it must be so placed as not to obstruct the fire of the breaching battery. And although the enemy's defences,, on the ramparts and bastions, have been demolished and his guns silenced, yet as the *Roūnee* wall remains entire, this battery, being near the enemy's works cannot be erected without much loss unless under cover from his musquetry in the *Roūnee*. The party stationed in the third parallel even, will not be able to silence this fire so as to render it possible for men to work at the battery without cover. Let there be prepared, therefore 24 large stakes or posts of green wood, 16 feet long and about 8 or 9 inches thick. Let the engineer, who is to mark out the ground for the battery, have two lines equal to the length of the base of the front face, divided into parts of 5 feet, and marked, at each division with a piece of red cloth, so as to be visible in the night. Let him picket these lines, at

each end, for the front of the redoubt, at the distance of 22 inches from each other, so that the marks on the one line may be opposite the middle of the space between those of the other; and having provided 12 gabions stuffed with fascines, (should cover be required) and 12 instruments for digging holes in the ground, for his posts, such as the natives use in this country, and call *Kyntee*; (which is a piece of iron like a carpenters chisel, stuck into a handle 2 or 3 feet long), let him place 12 sepoyes each with a *Kyntee*, and under cover of a stuffed gabion, with orders to excavate a hole, at each mark on the lines, 2½ or 3 feet deep, and of width sufficient to admit the end of a post. This will give a double row of holes, into which the posts are to be placed, about two feet asunder and a space between the rows of about 14 inches, thus  which space is to be filled up with fascines, as a barrier to cover the working party from the enemy's musquetry. In order to strengthen this barrier, and to enable it better to resist the pressure of the earth thrown up behind it, a large rope might be tied to the head of each outward post, before it is put up and afterwards fastened to logs buryed in the earth, of which the redoubt is constructed, by which means it would be supported, the outward slope

of earth, too, might be lessened, and consequently the labor considerably diminished. Such ■ barrier would enable the work to be carried on even by day in security, and by throwing up the earth first behind the barrier, and so on towards the rear, the redoubt might be constructed without loss, were the enemy even so active as to bring guns to bear on it.

Such a redoubt as this we think would almost always preclude the necessity of carrying on the works farther: it would render ■ lodgement in the glacis unnecessary, except for the purpose of destroying the enemy's countermines; and in case of a desperate defence of the breach, its value, in the hour of assault, as we shall afterwards see, would be incalculable.

Supposing, therefore, that the *Rollnee* wall has been demolished by such a battery, and that the besiegers have hitherto thought it unnecessary to carry on their works beyond it; but that it has been ascertained that the besieged have countermined the glacis; every attempt possible, must be made to destroy those mines. If they cannot be sprung in the way formerly suggested, or if the besieged cannot be tempted, by a false attack to spring them, ■ has been stated, was attempted at Bhurtpoor, it will be necessary, to carry on a sap to the foot of the

glacis, in order to discover the countermines, in the usual way, by boring, sounding, &c. &c. But if they cannot thus be discovered, from the head of this sap a trench may be run along the foot of the glacis 20 yards on each side; and three mines or fougasses may be sunk, one opposite the centre, and one at each extremity of this trench under the glacis. The concussion occasioned by these mines, when sprung, will, in all probability ruin the galleries and chambers of the enemy's countermines; besides which an opening will be made into the ditch, and perhaps some part of it filled up by the rubbish. It is essential that the enemy's countermines be destroyed, otherwise the besiegers cannot carry on their ulterior operations with safety.

In Europe various methods have been tried, and various plans have been recommended, to effect a passage to troops across the ditch of a fortification. They sap through the counterscarp, under the glacis, by several galleries; and if the ditch be dry, carry on their sap over the bottom of it, under cover of the batteries, and musquetry on the crown of the glacis; and, if it be a wet ditch, they sink bodies of fascines, and rubbish to make a road across it. Should there be a current of water in the ditch they fill up three-fourths or four-fifths of it, so as to leave

a space of 12 or 16 feet for the water to run through, over which a bridge of planks, is thrown for the passage of the troops.

The ditches of Forts in Europe, however, to facilitate the crossing of troops over which, those methods were of course invented, are in general very differently formed from those which we meet with in Hindoostan. Those of the former are seldom deep, but generally very wide, and with little slope, whilst those of the latter are generally very deep, and often very wide also, but have always a considerable slope, the nature of the soil being such, and the periodical rains so heavy that were ditches in this country not formed with a slope sufficient to allow for the waste made by water which lodges in them in the rains, the scarp and counterscarp which are generally of earth only would be undermined, and tumble in. Ditches in Hindoostan, are, therefore, sometimes met with, upwards of 40 feet wide at top, when perhaps at bottom they are scarcely more than 15, and from 20 to 40 feet deep. The difficulty of crossing such a ditch consists chiefly in its depth and form: it must either be filled up, so as to form a road for troops to cross, or it must be escaladed: it cannot be crossed by sap. To the former method several objections may be enumerated; the length

of time required to do it, the combustible quality of the materials used to fill it up, such as fascines, &c. which are easily set on fire by the enemy, and, moreover, such a passage when it is formed, becomes a receptacle as it were for combustibles (which the natives of this country always use in defence of a breach, such as pots filled with gunpowder, live coal, and stinking drugs, pitch and burning oil, into which they roll bags of gunpowder, casks of ghee, &c. &c.) to lodge upon, and burn out their fury among the troops as they pass. This last objection is also, for the same reason, applicable to the latter method of crossing a ditch, namely, by the common mode of escalade, for the troops must descend to the bottom of the counterscarp, and pass through such combustibles before they can ascend the scarp; and if the ditch contain much water, it cannot be crossed at all, without being filled up.

Were it possible therefore to invent a method of crossing ditches that would save the troops from the effects of such destructive obstacles as have been mentioned, and as we have seen, on every occasion used by the natives of India in defence of their Forts, and at the same time afford a sure and easy passage, the greatest and almost the only bar to our

success against Mud Forts, would be removed, and their capture be rendered certain.

To effect a practicable passage across a wide and a deep ditch, in the face of a resolute enemy, is an undertaking of vast difficulty, and although it may be easy to state objections to the means of effecting it, which have in general been adopted, and to relate various instances of their failure, yet it is by no means so, to point out others less objectionable: we think however that the following plan of a ladder would often be found to answer the purpose and it is accordingly submitted; but in recommending a plan which has never had the test of experience, we must speak with diffidence. It is a ladder made with a moveable or folding leaf, so that when put into the ditch, the folding leaf may be raised up, and swayed over, so as to rest on the scarp of the ditch; the main ladder thereby affording the troops a passage down the counterscarp, and the folding leaf enabling them to mount the scarp of the ditch; so that were there water in it even beyond their depth it could be crossed without inconvenience.

Such a ladder may be made of bamboos, three or four (according to the desired breadth) placed longitudinally, and with steps, of the same (or of wood) fixed across. If great length,

be requisite, the longitudinal bars must be built, of different pieces of bamboo, as is common, in this country, in making scaling ladders; because it would be difficult to find a single bamboo sufficiently long, and strong enough to answer. Its breadth may be five or six feet.

Its parts consist 1st of the *main ladder*, 2d of the flying or *folding leaf*, 3d the *supporter*, and 4th the *bearer*; and in addition to these, should there be much water in the ditch, it will be necessary to use a separate ladder, or *bridge*, to extend from the main ladder to the flying leaf, to carry the troops over, above the water: this last may be called the *bridge ladder*.

The length of the main ladder must of course be regulated by the dimensions of the ditch to be crossed. Supposing a ditch therefore of 40 feet in width, at top, 20 feet at bottom, and 20 feet deep, the length of the main ladder would require to be 36 feet.

To the main ladder, about two thirds of its length, or 24 feet, from the top, the *flying leaf* is fixed by an axle, which moves in an *eye*, or *bush*, lashed on to each of the longitudinal bars of the main ladder, on the upperside. This forms a *joint*, or *hinge*, by which the *flying leaf* is joined to the *main ladder* and becomes moveable. The *flying leaf* is made after the same

manner as the main ladder, and is about 28 feet long; the steps of both are made of wood, or bamboo, lashed on, and facing each other, and in order to render the descent and ascent easier to the troops, spars of deal, or other light wood may be fastened between the steps, to prevent the foot from slipping through. The main ladder need only have steps as far down as the joint of the flying leaf.

The *supporter* is made of three bamboos (or even two) placed longitudinally, with three or four bars fastened across, to keep them steady; and it is joined to the lower side of the main ladder, near the joint of the flying leaf, where the weight will chiefly fall, by a hinge similar to that above described. Its use is to support the main ladder when put into the ditch, that it may not break by the weight of the men in crossing.

The *bearer* is of a construction similar to that of the supporter, and is fixed to the lower side of the main ladder by the same kind of hinge or joint, almost half its (the bearer's) own length from the bottom of the main ladder; that, extending beyond the end of the main ladder it becomes a pivot for the latter to move on so as to be borne across towards the opposite side of the ditch.

The *bridge ladder* is made in the same way as the main ladder, but with steps of deal only. It is entirely separate, because necessary only where there is so great a depth of water, as to prevent the troops on the main ladder from reaching the flying leaf. When the bridge ladder is used, it is placed near the surface of the water, and rests, the one end on a step of the flying leaf, and the other end on one of the main ladder, thereby forming a communication between them, which the depth of water had cut off.

In carrying this ladder, and in placing it in the ditch, the *flying leaf* is folded up, and rests on the upper side of the main ladder, the *supporter* is folded up also; and is fastened, for the occasion, to the lower side of the main ladder, and the *bearer* is folded downwards, and bound by a cord tied to its lower end, and coming over the upper side of the main ladder, is fastened to the top thereof.

In this situation the *bearer* will extend considerably (about half its own length) beyond the end of the main ladder, so that when placed in the ditch, the whole will rest on the bearer, which will touch the ground first; but the position of the ladder, when first let down into the ditch, will naturally be too upright: it will not extend far enough across the bottom of the

ditch. The rope, therefore which bound the *bearer* will now be slackened, and the end of the ladder may be pushed forward; because, being kept by the bearer from touching the bottom, the main ladder moving on a pivot, may be borne across till its end come in contact with the bottom of the ditch near the opposite side. Thus, supposing a bearer eight feet long, joined to a ladder, four feet from its bottom, and projecting four feet beyond the end of the main ladder, the whole machine will be lengthened four feet, that on being let down into a ditch of the foregoing dimensions the extremity of the bearer touched the ground six feet from the counterscarp, by means of such a bearer, the ladder (the end of which being kept by the bearer off the bottom of the ditch), might be pushed over 11 feet, before its end reached the ground, which would bring it within three feet of the opposite side. This part of the machine is not of the author's own invention: a bearer of this kind to a ladder 28 feet long, and nearly five feet broad was made to be laid across the ditch at Bhurtpoor as a bridge.

After the ladder has been thus placed, the *supporter*, which, before, was lashed up to its back, will now be lowered down, till it reach the bottom, on which it will rest, and support the

main ladder. When this has been accomplished, the *flying leaf* (to the top of which three or four ropes, or braces, must be fixed) will be elevated by means of poles (pl. II. fig. 4), of bamboo, with iron forks on the end of them (pl. III. fig. 2), till it loose its balance and sway over, when it will be lowered down gently by the braces till it reach the opposite side of the ditch, on which it is to rest (pl III fig. 3), this must be done gently, so that the flying leaf may not be injured by its fall; which by taking a round turn (as a seaman would express himself) with the braces, round the top of the main ladder can be done, with great ease, by a few men holding on the braces, whilst the flying leaf is falling over. Should the flying leaf not be properly balanced, it will be apt to sway to one side; in which case it must be prevented, by carrying out to some distance, on each side, one of the braces, to be held by men, who will take care to preserve its perpendicular.

Should there be so great a quantity of water in the ditch as to prevent the ladder from sinking, the *bearer* will be unnecessary; because the water will answer the purpose for which that is intended. In this case, however, it will be necessary to sink the ladder; and this may be done by means of a bag of canvas, extending along the

Fig. 1.

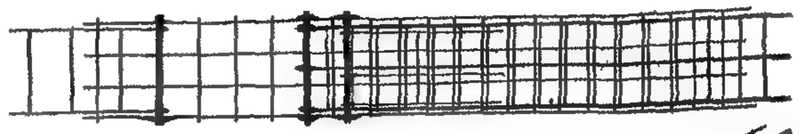


Fig. 2

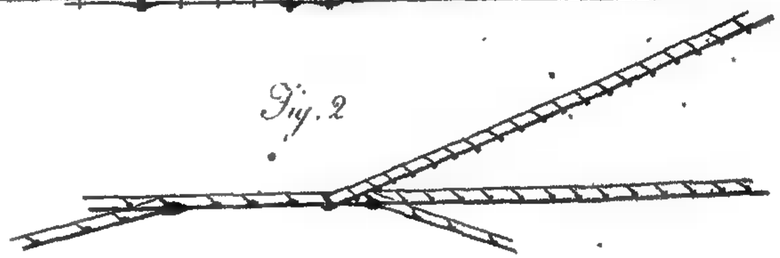


Fig. 3

Fig. 4

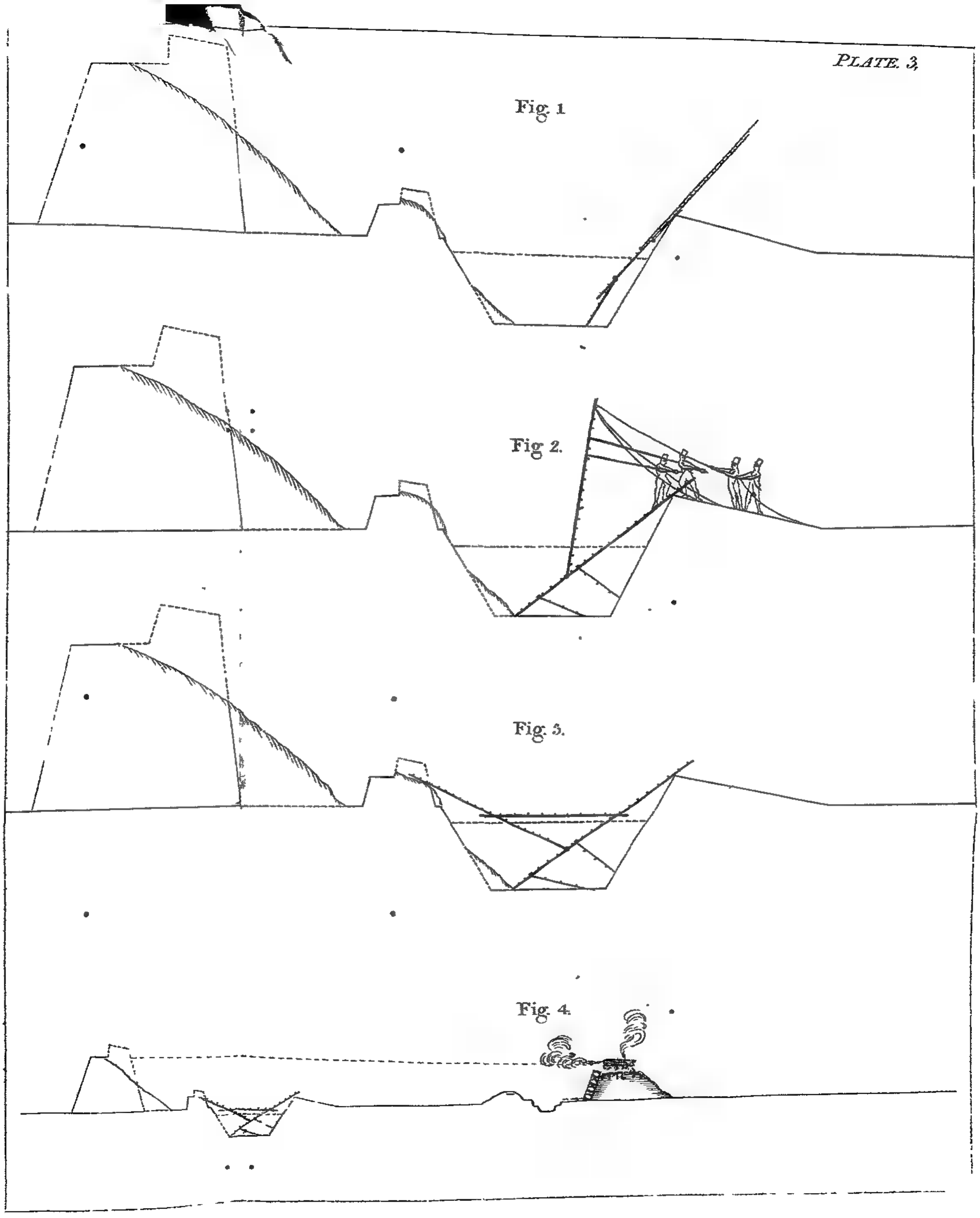


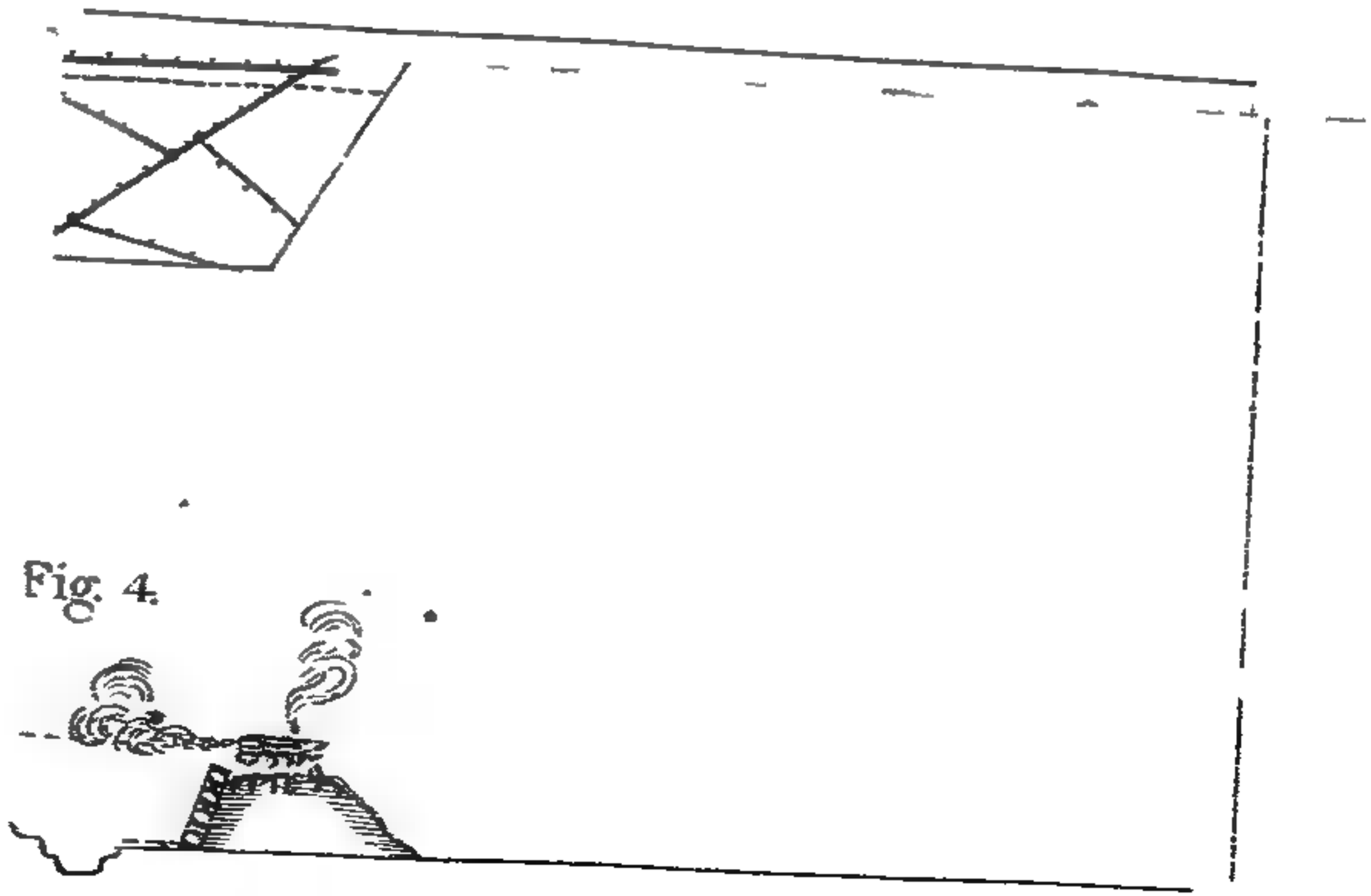
Fig. 1

Fig 2.

Fig. 3.

Fig. 4.

Fig. 4.



outside of the main ladder from top to bottom, on each side, forming as it were a tube closed at the bottom It must be wide enough to admit a large shot, which, when put into it will roll down to the bottom of the ladder, and there lodge: a few shot, conveyed in this way to the end of the ladder, will be sufficient to sink it.

We have thought it necessary to give this description of the ladder, but in order to render its form more easily comprehended, in pl. III, it is represented in its different positions in a ditch, the section of which is of the dimensions above stated.

A ladder of this kind is calculated for crossing almost any ditch we meet with in Hindoostan; the general width of such being from 20 to 40 or 45 feet. The form is already described, the section of which being a segment of an inverted cone, cut by a line parallel to its base thus

the depth of which is equal to one half, two thirds, or three fourths of its width. It would answer though the depth of the ditch to be crossed were less in proportion to its width, provided the width be not greater than is abovementioned; but if it were much greater a ladder such as that suggested would not answer.

Three ladders placed two feets asunder form

passage in breadth which would admit a column of 13 men abreast to pass with ease; and from their construction would enable men to cross a ditch which contained water beyond their depth, even to a great extent. Besides, these ladders would save troops, in a great degree, from being burnt by combustibles, such as have been mentioned, used by the natives in defence of a breach, because these would fall down between the ladders, and if the ditch were wet, be extinguished by the water, or, if dry, burn in the bottom, whilst the storming party walked in safety over them. This is an object highly worthy of consideration; for we know from experience, that there is nothing so galling to troops; nor is there any thing more likely to damp their spirits than exposure to such conflagration. It is worse than mines; for when the latter are once sprung, men know that nothing more is to be dreaded from them, but the former is a continual explosion through which every man must pass before he can get to the breach, and from the effects of which, no exertion he is capable of, can possibly save him.

These ladders must be carried to the ditch and placed in it, by soldiers who have been previously trained for the purpose. They ought never to be trusted, not even the carrying of

them, to men who cannot be depended on, as *Beldars*, &c. lest the enemy's fire should intimidate and make them run away, as unfortunately happened at Bhurtpoor on the night of the 9th January, the first assault. On that occasion 300 fascines were entrusted to as many *Beldars*, from the park, under the direction of a sergeant of artillery, to be carried to the ditch in case they should be wanted. On the advance of the storming party, the enemy commenced a heavy fire, and the whole of the *Beldars* fled: when they were required, not a man or fascine was to be found.*

* It might be rash perhaps to attribute the failure of the first assault at Bhurtpoor to this unfortunate circumstance, but that it contributed mainly towards it there is no doubt. So imperfectly was the state of the ditch known, the author has reason to believe, that scarcely any water was expected to be found in it. The storming party was commanded by Lieut. Col. MAITLAND of H. M. 75th Regt. whose coolness, and intrepidity on that occasion the author had an opportunity of closely witnessing, and which although he had not the honor of being privately known to him, he now desires to record as a humble tribute to the memory of an officer who fell on the unfortunate occasion of which he is speaking, a promising ornament to his country and to his profession. When the storming party advanced Col. MAITLAND put himself at the head of the column immediately behind the sergeant and twelve. Capt. WALLACE of the 15th

resolute, and determined to overcome every thing. It is a service in which *individual exertion* may effect much: a few brave and resolute men at the head of a storming party, if justice has been done in preparing their way will almost always ensure success. Every man in that situation ought to feel as if *all* depended on his own personal efforts. Let him push forward therefore, and distinguish himself by doing so, for, once in a breach his situation is equally hazardous whether he do or do not. If he do not, the enemy will advance upon him; and that, too, with additional courage acquired from his timidity, and he will then find it more difficult to withstand his enemy's charge, than, before, he would have done to have carried the breach. Let him push on; and when success shall have crowned his bravery, he will be astonished to find how easily he has gained a reputation to himself and a victory to his country!

The *weapons* used by the natives of Hindoostan in the defence of a breach are the spear, the *sword* and *shield*, and the *matchlock*: opposed to which we use only the *musquet and bayonet*. Those who defend the breach are often under cover, with their spears pointed outwards, and forming a barrier, against, which the bayonet can do nothing; whilst those who

assault are completely exposed, and cannot force their way through the spears of their opponents: nor can they use their musquets as fire-arms; for, in such a situation, it is scarcely possible for them to load a second time. We must therefore question the efficiency of the *Musquet* and *Bayonet*, when opposed to such weapons in a breach. When men meet with a check, if they cannot reach the enemy with their weapons so as to throw him into confusion, they must ultimately, themselves give way; if such a wall of spears, therefore, be presented as renders it impossible for the storming party to penetrate, with their bayonets, we would recommend to the officer commanding, to withdraw his men, for a moment, from the top of the breach, to enable the officer of artillery, in the elevated redoubt, to open his guns, again, upon it, over their heads, in order to throw the enemy into confusion; and when this has been effected, the attack will be repeated This plan, however, must be previously communicated to the artillery officer, in the redoubt, and the number of guns he is to fire ascertained, or a singal may be made to him to cease firing, that the moment the last gun is fired the men may instantly advance. It will also be necessary to make it known to the officers at the head of the column, and like-

wise to the men, lest they should not be prepared to fall back, and to obey an order which might be construed into a preparative to a general retreat, and their spirits be affected accordingly. *With an elevated* redoubt this may be repeated as often as circumstances may require, and doubtless, with steady troops, must at last inevitably succeed. *Here the utility of such a redoubt is very conspicuous.* Let me entreat the reader's attention to this; for certain it is that no troops on earth could resist such an attack, well conducted. Six pounders even would answer this purpose, and surely an elevated redoubt for guns of that calibre might be erected with little difficulty.

We might perhaps conclude here; but having questioned the efficiency of the bayonet when opposed, in this particular situation, to the spear and other weapons used by the natives of Hindoostan in defence of a breach; and deeming the following observations not unworthy of attention, we shall take the liberty of submitting them with some others for consideration.

Every man at the head of a storming party should be armed with a *brace of pistols* carried in holsters suspended round the neck, and fastened in front upon the breast, each holster containing a Lox with six cartridges. These pis-

tols would be of great use, and little inconvenience to the troops; and from being suspended in this way, would not be liable to be injured by water. in case it should be met with; neither would they prevent the men from using their musquets. Thus armed each man would have three loaded rounds to depend upon instead of one; and in certain situations he might be able to reload a pistol when he could not a musquet.

Pikes or *spears* might also be given to every second or third man, in order to oppose those of the enemy. Such pikes may be made of iron 14 or 15 feet long; and, in order to make them more manageable, might be cased with wood, or leather, to within three feet of the point. The *pikemen* will be ordered to sling their musquets, and when the breach is carried, unsling them, and leaving their pikes behind pursue the enemy.*

* A late writer in speaking of pikes says, though in field actions he gives the preference generally to the musquet, and bayonet, "I will not attempt to deny that "*chosen corps of pikemen formed in more solid columns* "might under partial circumstances be found irresistible." And again, "Tho' fire remains the best *general* weapon "to oppose all the branches of war, (i e. all weapons) "yet in particular instances where the use of the bayonet "is esteemed advantageous, in those cases chosen corps "of grenadiers *bearing defensive armour*, and carrying "formidable pikes would be irresistible." Now if this

Hand grenades might also be used with great effect; even empty ones might be used with success by firing their fusees, and throwing them (with two or three that are charged) among the enemy; who would expect the empty ones also to burst, and thereby be thrown into confusion: nor would the troops who used them be exposed to danger from their own grenades bursting among them, which is the great objection to the use of loaded grenades. The practice of using hand grenades * if it ever existed in this country,

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the use of pikes in a field action where the assailant has no impediment to his advance, except the weapon of the enemy, and where he may bring the shortest weapon to reach his opponent, much more must they be advantageous in a breach. At all events it is perfectly clear that a musquet and bayonet, merely as a piercing instrument, is of no use whatever when opposed by a weapon twice its own length, so long as that weapon, in combination with others preserves its proper position of defence; and under any other supposition no comparison of weapons can be made. Nor is it reasonable to combine the power of a musquet and bayonet as a fire-arm, with its use as a bayonet merely in the defence of the attack of a breach, for one round only [illegible] is to be looked for; [illegible] in general the musquet may be allowed the preference, though in particular situations another weapon may [illegible]

* [illegible] Encyclopaedia Brit. art. war p. 757. Speaking of the attack of a redoubt we find the following

has been discontinued; but we have seen instances where they would have been of the greatest importance. A bastion of very difficult access was attacked. It was defended by as many men as it could contain, armed with spears, which they presented through the embrazures and over the parapet (the men themselves under cover thereof) forming a barrier of spears, through which, so long as they remained steady, nothing could penetrate. When any of the assailants came within reach of a spear he was instantly pushed down, and perhaps carried one or two others along with him. The combat here alluded to lasted for nearly an hour, and must be in the recollection of many officers of the Bengal army. Let those who disapprove the use of hand grenades hear from them what they would have given for some on that occasion.

We think, too, that in storming a breach the use of *armour* might, in this country, be adopted

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passage: "The success of an attack is infallible if they "mount the four sides at once and take care to shower a "number of grenades among the enemy. During the siege of Cassell in 1762, a young Engineer undertook to carry "one of the out works with a much smaller detachment "than one which had been repulsed, and succeeded with "ease from the use of grenades, which is a proof that "grenades ought not to be neglected either in the attack "or defence, &c."

with great advantage, We do not mean unwieldy suits such as our forefathers wore, but a breast plate or cuirass made of metal (in scales or otherwise) to cover the front of the body and neck, and a helmet. Such need not be heavy, and might be worn with very little inconvenience; and certainly would be the means of saving the lives of many brave men on the personal, intrepidity of some of whom the success of the assault perhaps depended; besides which it would render them more efficient; for to make an impression the power of *resistance* is equally necessary with that of *penetration*. We have known the button on a soldiers jacket, the watch in an officers pocket resist a matchlock ball, which but for such resistance must have inflicted a mortal wound. Let the men in front be preserved by all possible means: on them every thing depends.*

Some men, to whom, on many subjects, much deference is due may object to what is here suggested, as being at variance with the

* Under the same art: mentioned in the foregoing note, there is the following passage, "as the soldiers who "mount the first may be easily tumbled over and their fall "may cause the attack to fail, it would perhaps be right "to protect their breasts with the foreparts of light cuiras- "ses, because if they penetrate the rest may easily follow." Enc. Brit. Art. War, p. 757.

character for intrepidity, which the British soldier has so long maintained, but such an objection as this we presume to despise. The object of the besieger is the capture of the place; and that with the least possible loss to himself. If this could be effected by intrepidity alone, then might a a sacrifice to intrepidity of a certain portion of his troops be admitted: then indeed might the question of intrepidity be settled on the plain, and the operations of a siege be dispensed with entirely. As well might an objection be made to trenches, batteries, saps, &c. &c. as to armour; for these are all intended to protect the besiegers from the fire of the enemy. It requires no trench dug in the earth, no sap to enable men to approach a Fort: it requires no battery to enable cannon to breach a wall, more than it requires armour to enable men to mount a breach; but the trench, the sap, the battery, all have been found necessary to cover the besieging army from the fire of the hostile garrison: and with the same propriety might *these* be objected to as the covering here recommended. We are aware that a real objection to the use of armour exists on account of its weight, which must render those who wear it unwieldy and inactive, but let it be remembered that activity alone will never carry a breach defended with desperate resolution: nothing short

of the strongest efforts of determined force as well as intrepid bravery can effect it. Fifty or 60 brave men at the head of a storming party, armed and shielded in the way here suggested, we think, would be irresistible; and if after they have carried the breach, their armour should be thought too cumbersome for them to pursue the enemy with, let them halt and let the light armed troops in their rear advance; those in front have done their duty.

It has already been said that the strongest efforts of bravery are required of those who lead a storming party. Every measure therefore which can in any degree tend to depress the spirits of the troops ought consequently to be avoided. On several occasions we have known troops lodged in the trenches, and kept there for eight or ten hours under a burning sun, before the assault took place. This is a practice, though very generally adopted, which we have no hesitation in saying must ever be attended with bad effects. Ten hours of motionless anxiety and confinement are surely not calculated to elevate the spirits of men. Far better would it be, under almost any circumstances, in this country, to lead them from camp straight to the breach. There is something solemn and awfully animating in the movement of a column on such an occasion, which must

awaken a degree of dignified bravery and confidence in the breast of a soldier which wearisome inaction can never inspire. No proof is requisite to establish, no argument necessary to illustrate this: the feelings of every man who has been in such situations must demonstrate to him the truth of it in stronger language than any we could use. If an idea of exposing the men too much should interfere in opposition to our opinion on this subject, let the storm be ordered at day break, and the troops move from camp so as to reach the breach by that time; taking care to prevent the enemy from being informed; which may be done by placing round camp a chain of sentries, from the Piquets, several hours before the storming party is ordered to parade, with instructions to prevent any native, without a pass, from quitting camp. Indeed we think that day break is the most eligible time for assault. At that hour men who have been watching all night as the besieged must be become languid from fatigue; and in the cold weather (which is the season wherein operations of this kind are generally carried on) the natives of Hindoostan are rendered extremely torpid and inactive by the cold; from which they suffer apparently more than the inhabitants do of the frozen regions of the north. Besides these, it would be easy to state

many other reasons for submitting this opinion.

Finally, with regard to the troops employed on the service of which we are treating. It will be allowed that the greatest exertions of bravery are required of those who head a storming party. We presume also to think that it cannot well be disputed that among men there are some who possess the power (whether natural or adventitious) more than others do of making strong exertions in time of danger. If so, then in cases of dangerous service, it is surely an object worthy of consideration to endeavour to procure such men as are most likely to perform it best; and these we have no doubt would be those who should voluntarily undertake the execution of it. We know that the practice of employing volunteers has been condemned by some generals of renown, but we imagine that this proceeded from a wish that the army should believe that their commander considered all as equally ardent and zealous. At all events we must be permitted to dissent from opinions which we believe human nature opposes and experience disproves.*

* "The choice of men that are to go upon the attack, "is so much the more essential as the success of the "enterprize depends upon it. *None but volunteers of* "*determined bravery* ought to be taken, &c. as to those "who support them they may be taken as the General "judges proper." Enc. Brit. Art. War, p. 756.

From a custom, which prevails of employing a serjeants party of volunteers to lead an assault, or what is called the Forlorn-hope, there seems to be a tacit acknowledged preference given to volunteers, from an expectation, no doubt, of their superior exertions on such occasions; and from the antiquity of the custom, it appears that in general the exertions of such men must have answered the expectations, which have been entertained; otherwise the practice of employing them would long ago have been discontinued as useless. Nor is this custom confined to cases of storming a breach, it is not unusual to employ volunteers in various other cases of dangerous service.

The natural inference to be drawn from such facts is that volunteers have in general acquitted themselves in a superior manner; but the reason we shall not undertake, altogether, to determine. There appears however, in the nature of man to be something, which strongly excites him to accomplish what he has voluntarily undertaken to perform; and in most men the more extraordinary the undertaking, the stronger the desire to accomplish it. Besides this, a man before he voluntarily undertake dangerous service will reflect, and if he do undertake it, as he must expect difficulties, so he will make up his mind to encounter them with fortitude, and to obviate with reso-

lution, every thing that can oppose him in the execution of it. Having his resolution thus strengthened by reflection, the same man will be more cool and determined than he would have been had the common course of his duty called upon him to experience danger which perhaps might exceed his expectation, and to encounter hardship which he had not cautioned his mind to resist. By appearing unexpectedly danger seems doubly formid ble, and strikes the imagination with a shock severe in proportion as it is unexpected. Moreover, when a man volunteers to perform a dangerous service, he finds himself placed in a conspicuous situation, and justly concludes that more than the fulfilment of ordinary duty is expected of him. He must exert the utmost of his power before he can justify himself for having thus stepped from obscurity, and placed himself in a situation of eminence, which those only are worthy of who are prepared to encounter difficulty and danger, and are capable of performing deeds of more than ordinary enterprize.

THE END.